Diet quality and socio-demographic characteristics of self-perceived vegetarians in the United States, 1977—2010

by

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Introduction

While the first recorded history of vegetarianism dates back to followers of the Orphic mysteries in the 6th century BC[1], vegetarian diets have been encouraged by more ancient texts of Hinduism[1, 2] and Buddhism[1]. Ethical vegetarianism arose with the Greek philosopher Pythagoras in the 6th century BC, who fathered the Pythagorean way of life, and influenced vegetarian nutrition until the 19th century in Europe[1, 3]. However, the mainstream diet that emerged in the United States was the Western Diet, which was heavy in animal proteins[4].

In the early 1970's, [5], vegetarianism began to gain popularity in the United States[6, 7]. Since then, there has been growing attention to the ethical reasons and potential health benefits of a vegetarian diet[8]. The Academy of Nutrition and Dietetics (AND) stated that "appropriately planned vegetarian diets…are healthful, nutritionally adequate, and may provide health benefits[9]." The 2015 Dietary Guidelines Advisory Committee recognized a Healthy Vegetarian Food Pattern[10]. However, no studies have examined how this diet and the people who practice it have *changed* since the 1970's in the US.

In 2007, between 2 and 5% of the United States population self-identified as vegetarian[7]. Small studies have found that self-identified vegetarians in the US in 1998 were more likely to be well-educated, middle-aged Caucasian or European-American[8], and female[11]. No studies in the United States have estimated this in larger, nationally representative sample, or estimated how this has changed over time. Understanding how the socio-demographic characteristics of vegetarians, and the vegetarian diet itself, have changed over time is important, because it may explain the health benefits of being vegetarian, and disparities in these health benefits among different populations of vegetarians.

Since the 1970's, there has been rapid changes in dietary patterns in the United States[12], driven by factors including industrialization, economic growth, and technological advancements[13]. Developed nations have been facing a nutrition transition towards a "Western Diet", high in saturated fats, sugar, and animal-source foods, but low in fiber. Advances in food processing have increased the availability of more highly processed and more energy dense vegetarian foods.[14, 15] It is unknown how the diet of self-perceived vegetarians has shifted over this time period, and whether it follows this trend towards a "Western Diet", increasing added sugar and saturated fat intake at the expense of whole grains and fruits and vegetables. Understanding how the vegetarian diet has changed over the past forty years can help explain changes in the health and nutritional status of vegetarians over this time.

While the classical definition of a pure vegetarian as one who does not eat any animal products was widely recognized[6, 16], it is unclear whether self perceived vegetarians have also increased meat intake. Self-perceived vegetarians belong to a heterogeneous group; for example lacto-ovo vegetarians exclude all animal products except eggs and dairy, and pollo-pescetarians limit meat consumption to chicken and fish[7]. If the number of these less restrictive types of vegetarianism has increased, self-perceived vegetarians may have also increased their consumption of animal proteins. The health benefits and drawbacks of animal protein are well known. Intake of animal protein has been associated with a greater risk of health complications including overweight[17, 18], obesity[18], colorectal adenomas[19], and gestational diabetes mellitus[20]. There are also few health benefits found to be associated with intake of animal protein, especially in aging populations. These benefits include lower age-related loss of lean mass[21], and lower risk of decline in higher-level functional capacity in men[22]. A dietary pattern including unprocessed animal protein that is low in saturated fat also supports a reduction in risk

of cardiovascular disease (CVD)[23]. Understanding whether self-perceived vegetarians have increased their own consumption of animal protein can shed light on the resulting health consequences in vegetarian populations.

The composition of the vegetarian diet is unknown, and the nutritional value of the foods vegetarians consume in place of animal products is unclear. Therefore, further research is needed on the composition and healthfulness of self-perceived vegetarians in the United States. Increasing knowledge of how the diet composition and socio-demographics of vegetarians have changed over time can help us to understand changes in the health and nutrition status of vegetarians. The objective of this study is to examine the shift in diet composition of self-perceived vegetarians over the past forty years, as well as the demographic and socioeconomic characteristics of being a self-perceived vegetarian in 1977 and in 2010. Using OLS regression, the probability of being a vegetarian by key demographic characteristics was examined for 1977-78 and 2007-2010. Consumption of key nutrients, including total daily kilocalories, ounces of meat, added sugars, whole grains, servings of fruits and vegetables were compared by vegetarian status in 1977-78 and 2007-2010. In doing so, the final goal is to compare the overarching picture of the diet of vegetarians over the past forty years in the United States.

Methods

Participants

This analysis includes 1,230 vegetarians and 69,617 non-vegetarians 19 years and older from three cross-sectional, nationally representative surveys of dietary intake. These surveys are: The Nationwide Food Consumption Survey (NFCS) for 1977-1978 (N = 48,418); and the National Health and Nutrition Examination Survey (NHANES) for 2007-2008, combined with

the 2009-2010 NHANES survey (N = 2249). All three surveys utilize a complex sampling design in order to provide nationally representative estimates for dietary intake that has been described previously.[24, 25]

Dietary Data

NFCS and NHANES collected individual dietary intake by interviewers who administered an in-home, 24-hour dietary recall. Foods available at the time of each survey were recorded using discrete food codes, and modifications that alter the nutrient content of a food code were indicated by modification codes. Food composition databases provided nutrient composition data, based on the U.S. Department of Agriculture (USDA) National Nutrient Database for Standard Reference. Nutrient data, including total servings of vegetables, fruits, whole grains, solid fats, added sugars, animal-source protein, and non-animal-source protein, were determined using USDA's Food Pyramid Equivalents Database (FPED) for 2007-2008, and FPED 2.0 for 2009-2010. These nutrient composition data were directly linked to their respective survey food codes. The NFCS did not have a MPED, so the NFCS survey food codes were matched to food codes in the NHANES9904, and MPED values from the oldest available year were used.

Data Analysis

Trends in diet composition and socio-demographic characteristics of U.S. self-perceived vegetarians were described between 1977-2010, using STATA version 14 (College Station, TX). Survey commands were used within STATA to account for the complex survey design and to incorporate sampling weights. A logistic regression was used to calculate the odds of being a

vegetarian for different demographic and socioeconomic groups in each survey year. A linear regression was used to estimate mean daily consumption of fruit (cups), vegetable (cups), whole grains (ounces), solid fats (grams), added sugar (teaspoons), eggs (ounces) dairy (cups), poultry (ounces), sea food high in Omega-3 fatty acids (ounce cooked lean meat), sea food low in Omega-3 fatty acids (ounce cooked lean meat), red meat (ounce cooked lean meat), soy products (ounces), nuts and seeds (ounces), legumes (cups), and total energy per capita (kilocalories). These estimates were adjusted for gender, race/ethnicity, household income, and household education, and calculated for vegetarians and non-vegetarians in each survey year. Linear trends were tested by examining confidence intervals. Data analysis occurred in 2016.

Results

Sociodemographics

Sociodemographic characteristics for all eligible participants in 1977-1978 and 2007-2010 are provided in **Table 1**. Participants younger than 19 years of age were excluded from this analysis. Self-perceived vegetarians in the U.S. were more likely to be female in both 1977-1978 (OR = 1.42) and in 2007-2010 (OR = 1.87). Self-perceived vegetarians in the U.S. were also more likely to identify with an ethnicity other than Non-Hispanic White (NHW), Non-Hispanic Black (NHB), or Mexican-American (MA), in both 1977-1987 (OR = 3.77) and in 2007-2010 (OR = 2.15) (**Table 2)**. In 1977-1978, NHWhites were more likely to identify as vegetarian than NHBlacks (OR = 0.65) or Mexican Americans (OR = 0.73). In 2007-2010, there was no difference between these races in odds of identifying as a vegetarian. During both time periods, vegetarians were more likely to come from households with income less than or equal to 130 % federal poverty level (FPL) (OR = 1.00). Conversely, the household referent of self-perceived

US vegetarians was more likely to hold a college degree in both 1977-1978 (OR = 1.77) and 2007-2010 (OR = 2.60).

Table 1. Sociodemographic characteristics of U.S. Self-Perceived Vegetarians and Nonvegetarians aged 19 to 100 years, 1977—2010, %

	Vegetarians		Non-vegetarians	
	1977-1978 (n=737)	2007-2010 (n=493)	1977-1978 (n=47,681)	2007-2010 (n=21,936)
Age, years[a]				
19-39	51.1	45.9	46.0	**37.5**
40-59	21.0	**34.4**	32.2	**38.2**
60-79	24.8	**11.3**	19.3	20.1
>=80	3.1	**8.4**	2.4	**4.2**
Gender				
Female	67.1	66.2	58.3	**52.3**
Race/Ethnicity				
Non-Hispanic white	84.7	**62.8**	83.4	**69.9**
Non-Hispanic black	6.7	8.2	11.0	11.4
Mexican-American	4.2	6.3	4.6	8.3
Other	4.4	**22.7**	1.1	**10.3**
Household income, % federal poverty level[b]				
<= 130	23.1	23.4	16.3	**21.7**
131-299	39.2	**26.9**	37.9	**28.5**
>=300	38.7	49.7	45.8	**49.7**
Household education[c]				
<High school	25.4	**16.2**	23.2	19.1
High school[d]	26.4	**13.8**	34.6	**24.4**
Some college	18.1	**28.5**	20.3	**30.5**
College degree	30.1	**41.5**	22.0	25.9

[a]Percentages are weighted to be national representative
[b]Household income expressed as percentage of the Federal Poverty Level
[c]Education level of household referent
[d]Graduated from high school or obtained GED
Bold indicates significant difference between 1977-1978 and 2007-2010 at p<0.05

Table 2. Probability of being vegetarian among different socioeconomic categories for people in the United States aged 19 to 100 years, 1977—2010.

	Vegetarians			
	1977-1978		2007-2010	
	OR	Standard Error	OR	Standard Error
Gender[a]				
Female	1.42*	0.16	1.87*	0.40
Race/Ethnicity				
Non-Hispanic white	ref	-	ref	-
Non-Hispanic black	0.65*	0.26	0.90	0.23
Mexican-American	0.73*	0.26	1.02	0.35
Other	3.77*	1.27	2.15*	0.66
Household income, % federal poverty level[b]				
<= 130	ref	-	ref	-
131-299	0.61*	0.12	0.78*	0.19
>=300	0.43*	0.10	0.70*	0.22
Household education[c]				
<High school	ref	-	ref	-
High school[d]	0.93	0.21	0.91	0.32
Some college	1.08	0.23	1.51*	0.47
College degree	1.77*	0.45	2.60*	0.78

[a]Odds ratios take into account survey design and sample weights.
[b]Household income expressed as percentage of the Federal Poverty Level.
[c]Education level of household referent
[d]Graduated from high school or obtained GED
*Asterisk indicates significant difference compared to reference confidence interval within each socioeconomic category

Total energy consumed

In 1977-1978, both vegetarians and non-vegetarians consumed similar amount of total energy (kcal) per day. However, in 2007-2010, non-vegetarians consumed more total energy (kcal) per day than vegetarians.

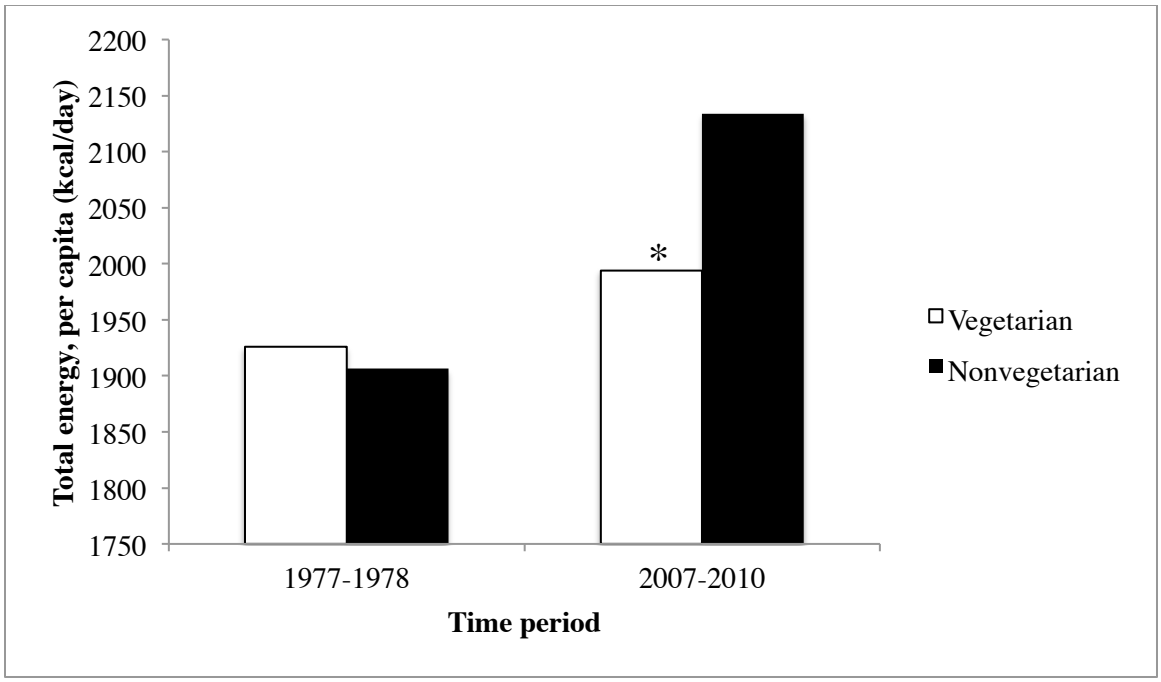

Figure 1. Mean total energy intake per capita consumed by vegetarians and nonvegetarians, 1977-2010

Fruits, vegetables, whole grains, SoFAS

In both 1977-1978 and 2007-2010, vegetarians consumed more fruits, more whole grains, and less solid fats than non-vegetarians at each time point (**Table 3**). For both vegetarians and non-vegetarians, fruit consumption has increased, while whole grain and solid fat consumption has decreased between 1977-1978 and 2007-2010. For non-vegetarians, the total amount of vegetables consumed daily has decreased from 1.69-cup equivalents in 1977-1978 to 1.56-cup equivalents in 2007-2010. Total added sugars consumed daily have increased for non-vegetarians, from 14.9 teaspoons in 1977-1978 to 18.4 teaspoons in 2007-2010. However, vegetarians have not seen these deleterious changes, with no change for vegetable and added sugar consumption over this time period.

Table 3. Fruit, vegetable, whole grain, solid fat, added sugar, and total energy consumption by vegetarians and non-vegetarians in the United States, 1977—2010[a]

	1977-1978		2007-2010	
	Margin	SE	Margin	SE
Fruit, cup equivalents/day[b]				
Total	0.66	0.02	**1.01**	0.02
Vegetarian	0.90	0.08	**1.24**	0.14
Non-vegetarian	0.59*	0.01	**1.00***	0.02
Vegetable, cup equivalents/day[b]				
Total	1.72	0.02	**1.56**	0.03
Vegetarian	1.74	0.10	1.59	0.12
Non-vegetarian	1.69	0.02	**1.56**	0.03
Whole Grains, ounces/day[b]				
Total	1.20	0.04	**0.76**	0.03
Vegetarian	1.92	0.23	**1.31**	0.17
Non-vegetarian	1.16*	0.03	**0.75***	0.03
Solid Fats grams/day[b]				
Total	99.4	1.44	**39.1**	0.48
Vegetarian	87.1	4.96	**30.4**	2.12
Nonvegetarian	99.6*	1.38	**39.3***	0.49
Added Sugar, tsp/day[b]				
Total	14.9	0.30	**18.4**	0.40
Vegetarian	14.9	0.98	16.5	1.12
Nonvegetarian	15.2	0.23	**18.4***	0.40
Total energy, per capita[c] (kcal/day)				
Total	1953.6	13.6	**2131.2**	15.4
Vegetarian	1926.0	61.5	1994.1	73.1
Nonvegetarian	1906.4	11.6	**2134.1***	15.5

[a]Data for adults aged 19-100 years. Values are M+/- SE and take into account survey design and sample weights.
[b]Energy Intake per day provided added sugar, by fruits, vegetables, whole grains, or in vegetarians and nonvegetarians, 1977-2010

[c]Mean total energy intake per capita consumed by vegetarians and nonvegetarians, 1977-2010
Bold indicates significant difference between 1977-1978 and 2007-2010, based on confidence interval
*Asterisk indicates significant difference in vegetarian compared to nonvegetarian confidence interval in the given year

Animal protein sources: eggs, dairy, poultry, seafood, and red meat

In both 1977-1978 and 2007-2010, vegetarians consumed less poultry and red meat than non-vegetarians, however the amount of poultry and red meat consumed has increased for both groups over time (**Table 4**). In 1977-1978, vegetarians and non-vegetarians consumed similar amounts of seafood (both high and low in Omega-3 Fatty Acids), while the amount of seafood consumed by non-vegetarians has increased between the two time periods. In 2007-2010, non-vegetarians consumed more seafood low in Omega-3 Fatty acids than vegetarians. In 1997-1978, vegetarians consumed more dairy than non-vegetarians; between 1997-1978 and 2007-2010, the total amount of dairy consumed increased more for non-vegetarians than vegetarians, such that in 2007-2010, non-vegetarians consumed more dairy than vegetarians.

Table 4. Consumption of animal protein sources by vegetarians and non-vegetarians in the United States, 1977—2010[a]

	1977-1978		2007-2010	
	Margin	SE	Margin	SE
Eggs **Oz equivalent/day[b]**				
Total	0.79	0.01	**0.52**	0.01
Vegetarian	0.74	0.06	**0.43**	0.07
Non-vegetarian	0.77	0.01	**0.52***	0.01
Dairy **Cup equivalents/day[b]**				
Total	0.97	0.02	**1.66**	0.03
Vegetarian	1.23	0.12	**1.48**	0.11
Non-vegetarian	0.97*	0.01	**1.67***	0.03
Poultry				

Oz equivalent/day[b]				
Total	0.93	0.03	**1.51**	0.04
Vegetarian	0.67	0.12	**1.48**	0.11
Non-vegetarian	0.83*	0.02	**1.67***	0.03
Sea Food High in Omega-3 **Oz cooked lean meat/day[b]**				
Total	0.12	0.01	**0.17**	0.01
Vegetarian	0.11	0.06	0.29	0.18
Non-vegetarian	0.09	0.01	**0.16**	0.01
Sea Food Low in Omega-3 **Oz cooked lean meat/day[b]**				
Total	0.35	0.02	**0.47**	0.03
Vegetarian	0.26	0.06	0.20	0.07
Non-vegetarian	0.30	0.01	**0.48***	0.03
Red Meat **Oz cooked lean meat/day[b]**				
Total	2.54	0.03	**1.69**	0.04
Vegetarian	1.20	0.18	**0.59**	0.04
Nonvegetarian	2.55*	0.03	**1.71***	0.12
Total energy, per capita[c] (kcal/day)				
Total	1953.6	13.6	**2131.2**	15.4
Vegetarian	1926.0	61.5	1994.1	73.1
Nonvegetarian	1906.4	11.6	**2134.1***	15.5

[a]Data for adults aged 19-100 years. Values are M+/- SE and take into account survey design and sample weights.
[b]Energy intake per day provided by eggs, dairy, poultry, sea food, or red meat in vegetarians and nonvegetarians, 1977-2010
[c]Mean total energy intake per capita consumed by vegetarians and nonvegetarians, 1977-2010
Bold indicates significant difference between 1977-1978 and 2007-2010, based on confidence interval
*Asterisk indicates significant difference in vegetarian compared to nonvegetarian confidence interval in the given year

Non-animal protein sources: soy, nuts/seeds, and legumes

In both 1977-1978 and 2007-2010, vegetarians consumed more soy products than non-vegetarians. The amount of soy products consumed has increased for both between the two time periods. In 1977-1978, vegetarians consumed more nuts and seeds than non-vegetarians. However, between 1977-1978 and 2007-2010, the amount of nuts and seeds consumed by vegetarians has decreased, such that in 2007-2010, vegetarians and non-vegetarians consumed similar amounts of nuts and seeds. In 1977-1978, vegetarians and non-vegetarians consumed similar amount of legumes. In 2007-2010, vegetarians consumed more legumes than non-vegetarians.

Table 5. Consumption of non-animal protein sources by vegetarians and non-vegetarians in the United States, 1977—2010[a]

	1977-1978		2007-2010	
	Margin	SE	Margin	SE
Soy Products, Oz equivalent/day[b]				
Total	0.03	0.004	**0.08**	0.01
Vegetarian	0.15	0.06	**0.45**	0.10
Non-vegetarian	0.02	**0.002**	**0.08**	**0.01**
Nuts/Seeds, Oz equivalents/day[b]				
Total	0.69	0.02	**0.63**	0.03
Vegetarian	1.42	0.25	**0.77**	0.21
Non-vegetarian	0.66	**0.02**	0.63	0.03
Legumes, Cup equivalent day[b]				
Total	0.05	0.01	**0.45**	0.03
Vegetarian	0.06	0.02	**0.89**	0.20
Non-vegetarian	0.05	0.002	**0.44***	0.03
Total energy, per capita[c] (kcal/day)				

Total	1953.6	13.6	**2131.2**	15.4
Vegetarian	1926.0	61.5	1994.1	73.1
Nonvegetarian	1906.4	11.6	**2134.1***	15.5

[a]Data for adults aged 19-100 years. Values are M+/- SE and take into account survey design and sample weights.
[b]Energy intake per day provided by soy products, nuts/seeds, and legumes in vegetarians and nonvegetarians, 1977-2010
[c]Mean total energy intake per capita consumed by vegetarians and nonvegetarians, 1977-2010
Bold indicates significant difference between 1977-1978 and 2007-2010, based on confidence interval
*Asterisk indicates significant difference between vegetarian and non-vegetarian in the given year

Discussion

This study describes and compares dietary patterns and demographics of self-perceived U.S. vegetarians and non-vegetarians from 1977–2010. In both 1977-1978 and 2007-2010, US self-perceived vegetarians were more likely to be females, from households at or below 130% FPL, where the household referent held a college degree. This is the first study of a national representative sample of the United States to find females more likely to be vegetarian than males. A study in the UK[26] also found vegetarian dietary patterns higher among 13-year old girls, and children whose mothers had higher levels of education were also more likely to be vegetarian. Our findings are also supported by a study[27] in US black and white adults that found higher education is a more important predictor of following a plant-based dietary pattern, than SES among both races.

The current study found vegetarian protein sources (legumes, dairy, and eggs) to be more commonly consumed among self-perceived US vegetarians in low SES populations, than poultry and red meat. The significance of this difference between low and middle to high SES populations has decreased between 1977-1978 and 2007-2010. However, these findings still conflict with previous research in the United Kingdom (UK)[28], Australia[29] , and India[30] that

draw associations between high socioeconomic status (SES) and consumption of a vegetarian diet. The high proportion of immigrants in the United States may explain this difference. In 2011, there were 54.1 million immigrants and US born children, of which 23 % lived in poverty, compared to 13.5 % of natives and their children[31]. If these immigrants were also vegetarian, it would support our study's findings that vegetarianism is common among low SES populations in the US. Additionally, immigrants are more likely to identify as a race "other" than NHW, NHB, and MA. If these immigrants were also vegetarian, this supports our study's findings that vegetarians are more likely to identify as "other" race. However, further studies on the motives of low SES people for being vegetarian are required to develop a complete resolution of these findings.

It is unclear whether there are differences in dietary patterns of vegetarians from lower and higher SES. A study in the Netherlands[32] highlights associations between high SES, and consumption of diets rich in fruit, vegetables, and whole grain, and low in added fats and refined grains. The current study has found such a diet to be common in self-perceived US vegetarians. Californian women with the lowest income were found to be least likely to consume fruits and vegetables than women of higher income. As fruits and vegetables are the major constituents of a vegetarian diet, this study also conflicts with the current study's association between vegetarian diet and low SES. It may be predicted that higher SES vegetarians also consume more fruits and vegetables, and occasionally consume animal protein sources as well. The small sample size of vegetarians in the current study may have led to the discrepancy found with past studies.

In 1977-1978, NHW were more likely to be vegetarian than NHB and MA; however, this disparity neutralized in 2007-2010, when there were equal odds that NHW, NHB, and MA identified as vegetarian. A study of fruit and vegetable (FV) consumption in women (from 2012-

2013 data in California, USA) found women from all racial and ethnic groups studied were less likely to have FV in the home, and less likely to consume FV daily, than NHW. Studies[33, 34] also suggest increased availability of fruits and vegetables correspond to increased fruit and vegetable consumption. Whether the availability of vegetarian foods to NHB and MA has increased between 1977-1978 and 2007-2010 is unclear, and requires further research. There may have also been increased immigration of NHBlacks, Mexican Americans, and people of other races/ethnicities to the United States, who identify as self-perceived vegetarians, between 1977-1978 and 2007-2010. However, further research is required to confirm this proposition. Developing an understanding of disparities in dietary patterns will help us to understand and prevent the consequential disparities in health that exist among different race/ethnicities.

Between 1977-1978 and 2007-2010, there have been shifts in the dietary patterns of vegetarians and non-vegetarians: for both vegetarians and non-vegetarians, fruit, poultry, and red meat consumption has increased while whole grain and solid fat consumption has decreased; vegetarians have also decreased consumption of eggs, nuts, and seeds and increased soy, dairy, and legume consumption. In both 1977-1978 and 2007-2010, vegetarians consumed more fruits and whole grains, and less solid fats, poultry, and red meat than non-vegetarians. In 2007-2010, vegetarians also consumed less egg and dairy, and more soy products and legumes than non-vegetarians. Similar patterns of food consumption as found in 2007-2010 self-identified vegetarians from NHANES were identified in previous study[35] of vegetarians from the 2002-2007 Adventist Health Study-2 (AHS-2). However, the previous study defines vegetarians as those excluding certain animal foods from the diet, while the current study refers to those who self-identify as vegetarian. The current study is also unique, because it is the first to compare dietary and demographic trends in vegetarians and non-vegetarians from 1977-1978 (NFCS) to

2007-2010 (NHANES). The differences highlighted by this study are important, as they may help to explain differences in health and mortality[36-41] of vegetarians and non-vegetarians between these time periods.

Strengths and Limitations

The major strength of this analysis is the use of two large, nationally representative samples of vegetarians and non-vegetarians from 1977-1978 and 2007-2010. This has allowed for the analysis to compare the dietary patterns and socio-demographics of vegetarians and non-vegetarians during and between these two time periods in the United States. The major limitation for this analysis is the small sample size of vegetarians in both 1977-1978 and 2007-2010. The small sample size has led to larger standard errors in our predictions of the vegetarian diet and socio-demographics during these time periods. The study is also limited, because the dietary data is based off a single 24-hour recall, which may not be representative of the usual dietary pattern participants, and in particular may miss episodically consumed foods, such as animal proteins by self-perceived vegetarians. . Finally, there may have been a misreporting of foods during the 24-hour recall, which can be biased by gender, weight status, and may be more problematic for specific nutrients, such as added sugars. Because this study does not distinguish between dietary patterns of vegetarians within different SES/education categories or assess motives for being vegetarian, further research is required to understand the results of this analysis.

Conclusion

This study provides an understanding of the differences in dietary patterns and socio-demographics of vegetarians and non-vegetarians in 1977-1978 and 2007-2010. In both the early

and later time periods, US self-perceived vegetarians were more likely to be females from households at or below 130% FPL, where the household referent held a college degree. In 1977-1978, NHW were more likely to be vegetarian than NHB and MA; in 2007-2010, there were equal odds that NHW, NHB, and MA identified as vegetarian. These findings may help understand disparities in health among member of different race and ethnicities, due to vegetarian status. Between 1977-1978 and 2007-2010, for both vegetarians and non-vegetarians, fruit, poultry, and red meat consumption has increased while whole grain and solid fat consumption has decreased; vegetarians have also decreased consumption of eggs, nuts, and seeds and increased soy, dairy, and legume consumption. In both 1977-1978 and 2007-2010, vegetarians consumed more fruits and whole grains, and less solid fats, poultry, and red meat than non-vegetarians. In 2007-2010, vegetarians also consumed less egg and dairy, and more soy products and legumes than non-vegetarians. These findings may help to understand differences in health between vegetarians and non-vegetarians that can be attributed to the vegetarian diet.

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